



**Coverage Mapping re
T-Mobile Application for Variance for
a Wireless Communications Facility at
22 Griffin Road, Westford, Massachusetts**

17 July 2010

Broadcast Signal Lab was engaged by the Town of Westford to assist with the review of the T-Mobile application for variances for a Wireless Communications Facility (WCF) including a new tower, at 22 Griffin Road (Site). The applicant seeks a use variance as well as a variance from the 900-foot dwelling setback in the WCF bylaw (6.2.3) and from the 35 foot height limitation in the Table of Dimensional and Density Regulations (Appendix C). Applicant also seeks a variance to the limitation of not more than one principal structure on a lot (4.1.2).

This report provides a supplemental assessment of T-Mobile signal coverage topics summarized in our Further Commentary report dated July 16, 2010. Coverage maps illustrating the comparative coverage of various options are provided.

Our coverage analysis is performed with GIS and signal propagation software using state of the art methods to make and plot coverage predictions. Since our input data and our modeling software differs from T-Mobile's, there will be minor discrepancies between our results and T-Mobile's. However, the plots presented below give a reliable first-approximation of the potential of different facilities to achieve coverage to T-Mobile's specifications in the targeted area.

First, we plotted the proposed facility at the 137 foot antenna height at 22 Griffin Road. Our results are quite similar to T-Mobile's plot of the same location and height. The fine structure of the plots (in a point by point comparison) differs, but the overall impression is close enough to allow us to develop plots of alternatives. Note that it is most appropriate to compare T-Mobile plots to T-Mobile plots, and Broadcast Signal Lab Plots to Broadcast Signal Lab plots when evaluating alternative sites, but not to cross-compare between the two sets. Cross comparison of

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T-Mobile's plots with our plots should be limited to assessing the modeling similarities and differences when two identical facilities are modeled by both parties.¹

The coverage from the proposed facility at the proposed height is shown in Figure 1.

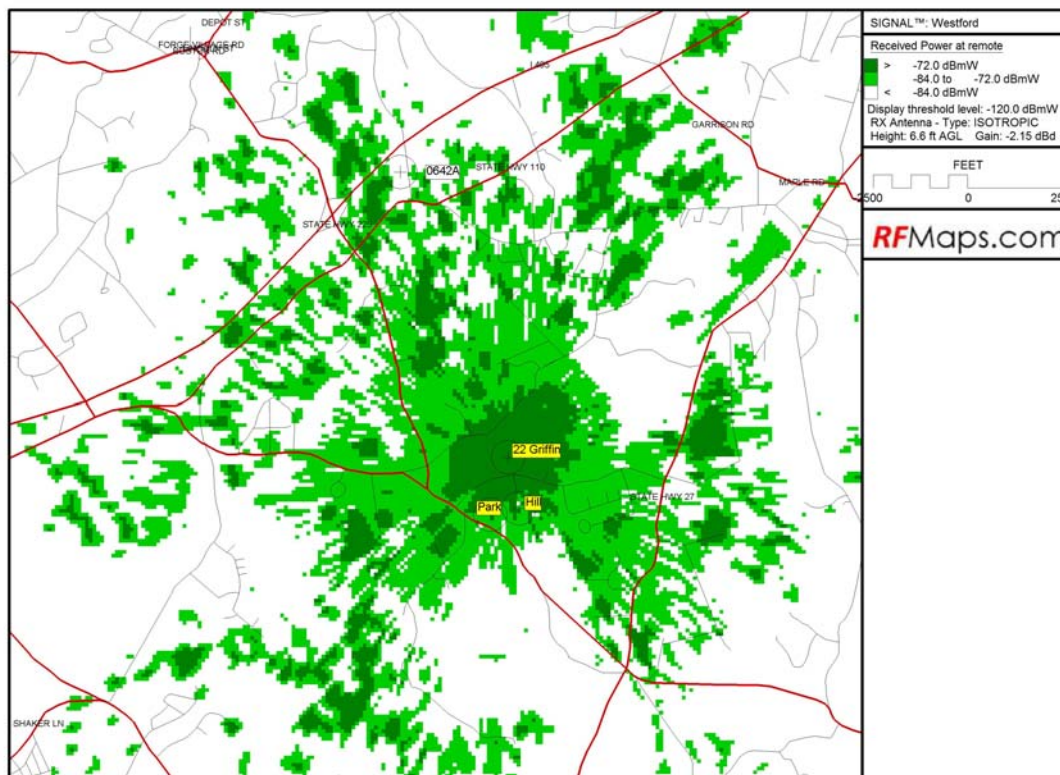


Figure 1 Projected PCS Coverage from 137 feet above ground at proposed site

Considering a location near Interstate 495, we modeled the location of the existing 4BS0642A tower site using a 150 foot above ground antenna height. This is shown in Figure 2. Observe how the general area of the proposed facility is shown as not receiving T-Mobile's desired level of service from the hypothetical 150-foot tower by the highway. This area includes Griffin, Old Lowell, Concord, and Carlisle Roads.

¹ For those interested in accuracy of the plots, it may be instructive to know that two moderately different-looking plots of the same facility coverage could be equally accurate. This is because the modeling of radio frequency propagation is a statistical analysis that results in a bell curve of variation between the plotted data points and the actual signal levels measured in the field.

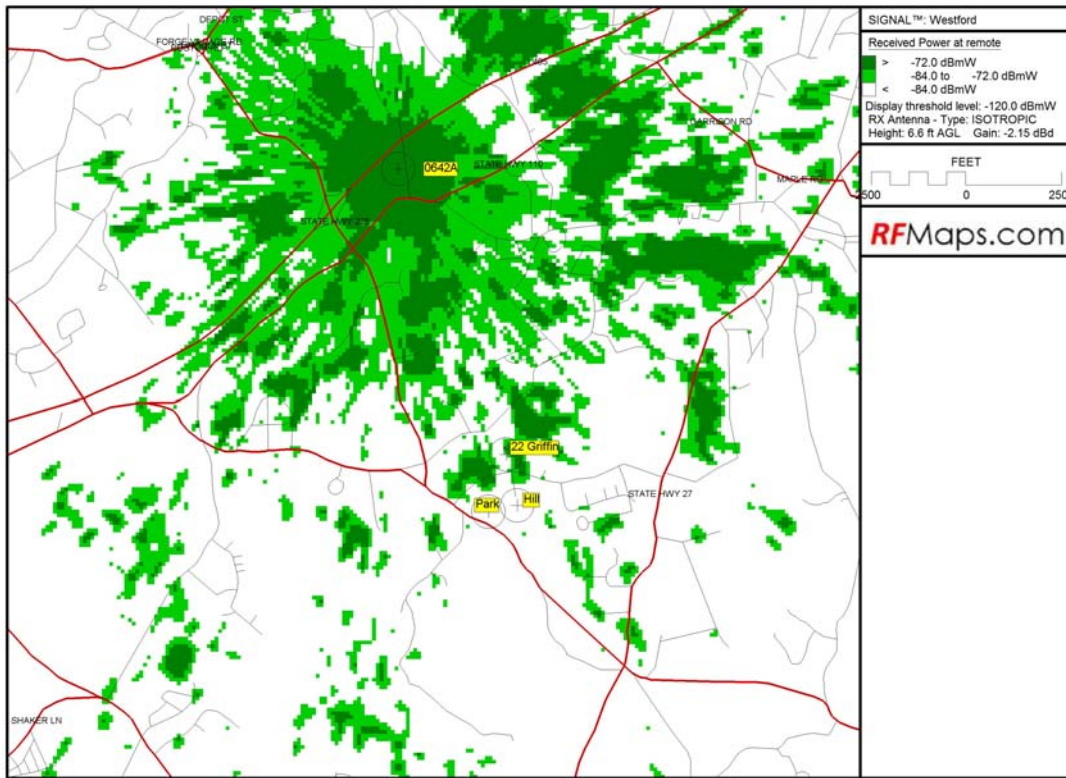


Figure 2 - Coverage from 150 feet above ground at 4BS0642A tower site

Next, Figure 3 shows coverage from an antenna at 100 feet in the Walsh Recreation Area. It is located on higher ground than the field, and is beside the hill to the east. This hill blocks the signals from passing to the Overlook and Mark Vincent Drive areas. The site would require an access drive to be cut into the parcel. The site is subject to a public RFP process. Visibility of a 100 foot tower would need further analysis. The possibility of a 140 foot tower might be considered in order to increase the structure's co-location potential.

Figure 4 shows coverage from a site on the hill. We selected a wooded area north of the bend in the driveway to the residence on the summit. The location is marked on Figure 5. It is some 50 feet lower than the summit. We modeled a 65 foot antenna height, assuming this would just project above the surrounding trees and would likely not be visible from the residences around it. Longer distance views, if any, might have a sightline to the top of the structure. However, with the low elevation above the trees and proper coloring and/or camouflage design, it may not be readily noticeable.

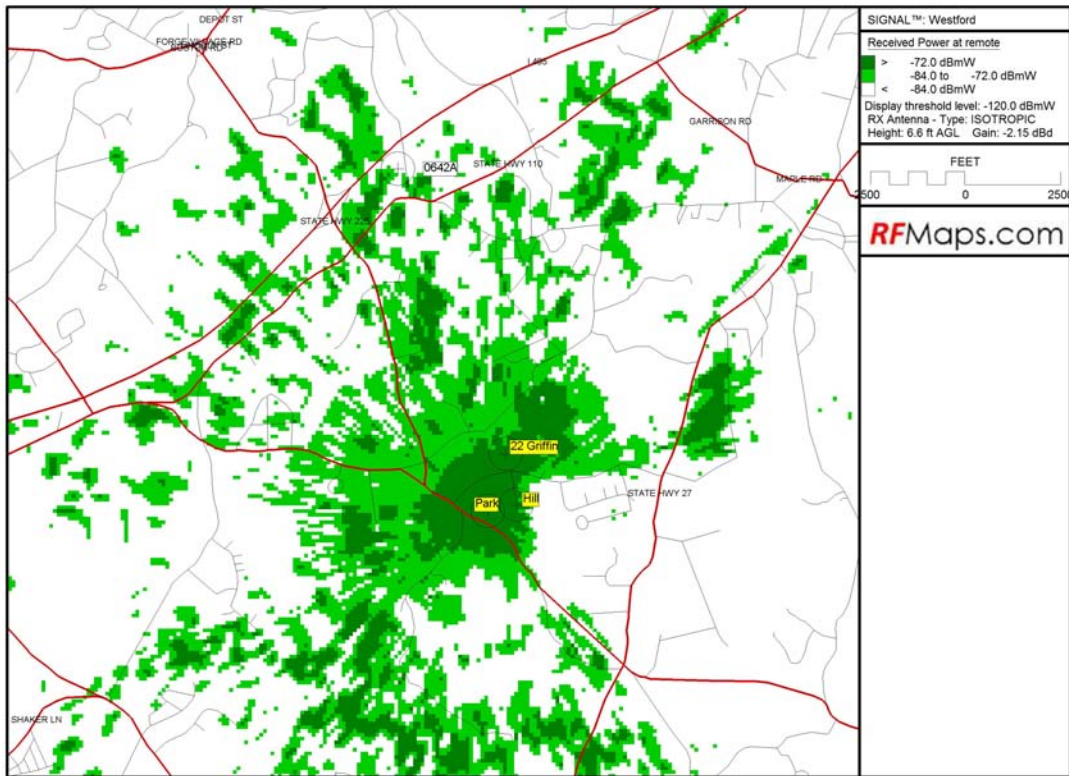


Figure 3 – PCS Coverage from Jack Walsh Recreation Area at 100-foot antenna height

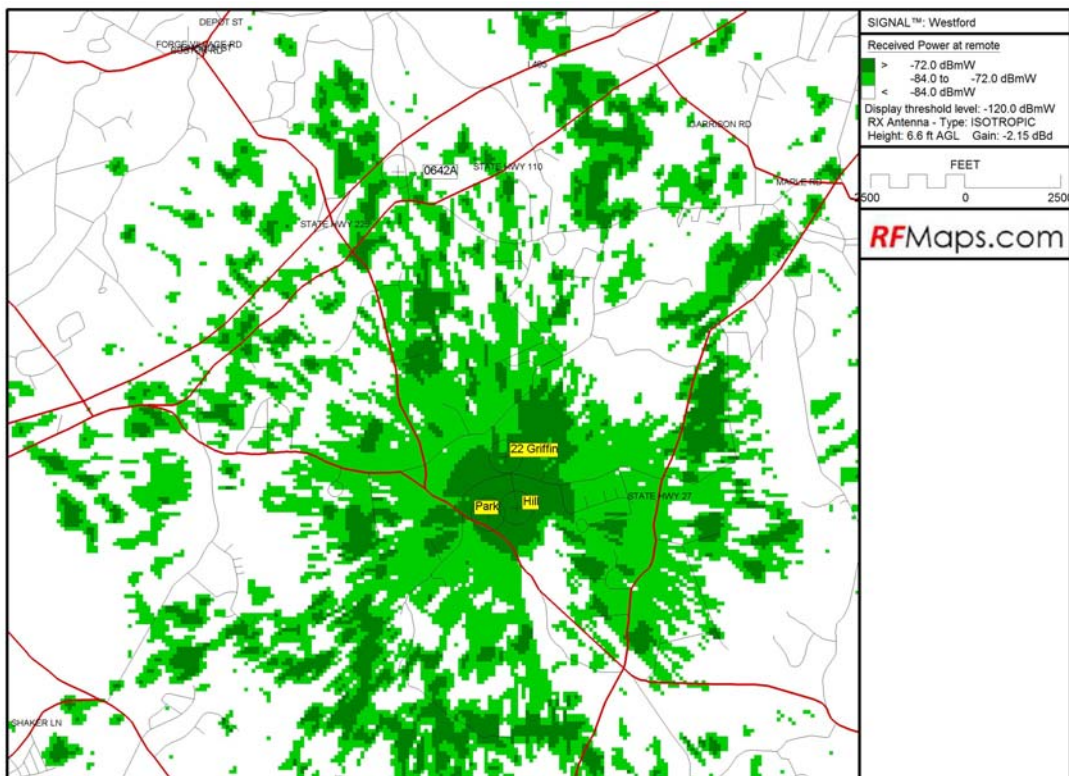


Figure 4 - PCS Coverage from just above tree height (est. 65 feet) on Hill Site

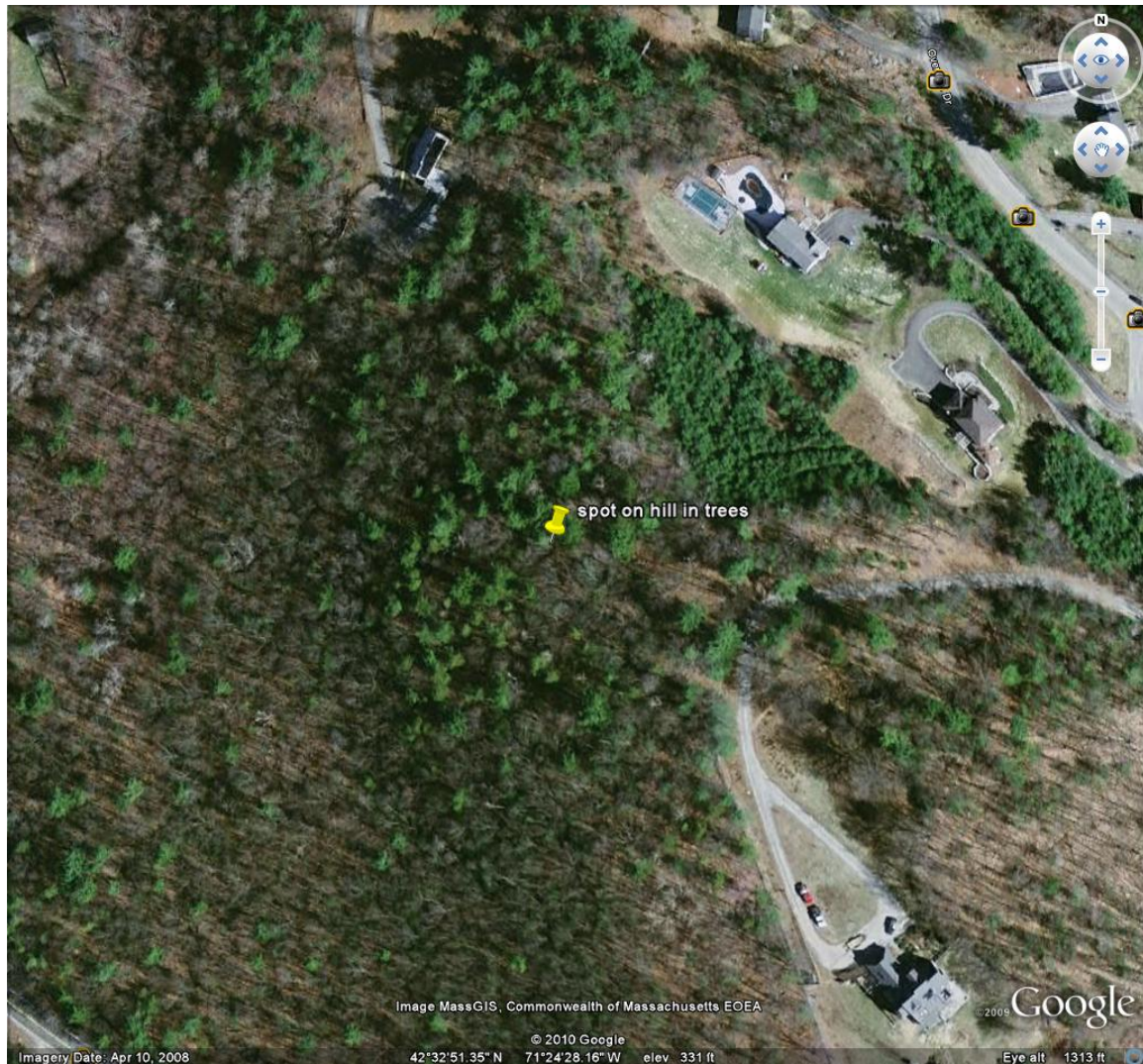


Figure 5 - Position of Hypothetical Tower Site on Hill

We selected this location on the hill in order to minimize the potential visibility to the surrounding residences. (A wireless facility in a cupola placed on the summit-house would be very compelling from a coverage standpoint, but even more dependent on the owner's flexibility than a site in the woods nearby.) We have not evaluated ownership of, or access to, the hypothetical site. If it seems promising from the Town's perspective, further work could be done to explore its viability.

The possible advantages of the Hill site, if viable, include tower height less than 100 feet, potential near-invisibility to the community, potential to be at least 300 feet from residences (only if an ideal position can be identified). The potential disadvantages are the uncertainty of its viability until further researched, uncertainty whether the height setback can be achieved, non-

compliance with the 900-foot setback, and the lack of co-location space on the structure (unless a height greater than about ten feet above the surrounding tree canopy can be achieved without significantly compromising the visual impact of the tower).

In summary, the Jack Walsh Recreation Area location for a wireless facility could be further studied if the presently known disadvantages of the location are not show-stoppers. As well, the Hill site could be further studied, if the known disadvantages are not show-stoppers.

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